

### **REMARKS**

Claims in the case are 54-71, upon entry of this Amendment. Claims 54-57 and 60-63 have been amended, claims 68-71 have been added, and no claims have been cancelled herein.

#### **Support for Claim Amendments and Added Claims:**

Support for the amendments to claims 54-57, and added claims 68-71 is provided by the specification as a whole, and, more particularly, by claims 54-57 themselves, page 4, lines 8-11, and page 8, lines 1-5 of the specification.

Claims 60-63 have been amended herein to depend from added claims 68-71, respectively.

#### **Anticipation Rejection:**

Claims 54-57 and 59-67 stand rejected under 35 U.S.C. § 102(b) as being anticipated by WO 00/72874 A1 (**Naidu**). This rejection is respectfully traversed in light of the amendments herein and the following remarks.

Naidu does not disclose or suggest a solution comprising lactoferrin having a pH below 3. In addition, Naidu does not disclose or suggest a solution comprising lactoferrin and a metal chelating agent that has a pH below 3.

Naidu discloses a dispersion of immobilized lactoferrin (*Im-LF*) that can optionally further include native lactoferrin. See, for example, the Abstract; page 7, line 34 through page 8, line 9; page 11, lines 17-24; and claims 1 and 6 of Naidu. The compositions disclosed by Naidu can further include a buffer, in which the buffer system includes: a combination of physiologically acceptable acid, such as oxalic acid, ethylenediamine tetraacetic acid (EDTA), carbonic acid, or, preferably, citric acid; a physiologically acceptable base, preferably sodium bicarbonate potassium bicarbonate, sodium carbonate, or potassium carbonate; and a physiologically acceptable salt, such as calcium chloride, potassium chloride, or preferably sodium chloride. See, for example, page 14, lines 12-23 of Naidu. Naidu further discloses the pH of such aqueous solutions containing *Im-LF* as being about 4-8, and in

particular, 5.5-7.5. See, for example, page 14, lines 24-25 of Naidu. Claim 17 of Naidu, for example, is directed to a composition that includes *Im*-LF and native LF in an aqueous buffer of physiologically acceptable base, acid, and salt, that has a pH of 5.5 to 7.5.

Naidu teaches that the **citrate to bicarbonate ratio** in the buffer is significant for purposes of coordinated metal-binding of lactoferrin (LF). See, for example, page 14, lines 18-19 of Naidu.

In light of the amendments herein and the preceding remarks, Applicants' claims are believed to be unanticipated by and patentable over Naidu. Reconsideration and withdrawal of the present rejection are respectfully requested.

#### **Obviousness Rejection:**

Claims 54-67 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Naidu. This rejection is respectfully traversed in light of the amendments herein and the following remarks.

The method of Applicants' present claims is directed towards providing a method for reducing microbial contamination of various surfaces and cavities, including food products, and to improve the antimicrobial activity of lactoferrin for use in decontamination applications. See, for example, page 2, line 3 through page 3, line 31 of the specification. As demonstrated, in particular in Example 2 (Figures 1A and 1B) and Example 4 (Figures 3A and 3B) of the specification, this goal is achieved with the method of the present claims, which involves administering a solution including lactoferrin having a pH below 3, or a solution comprising lactoferrin having a pH below 3 that further includes a metal chelating agent, such as EDTA.

Naidu provides no disclosure or suggestion with regard to the use of a solution including lactoferrin having such a low pH, and, in particular, a pH of less than 3.0, which can optionally further include a metal chelating agent, such as EDTA.

Attention is directed to page 7, lines 11-20 of Naidu, which states that "*LF can release the bound iron in a fully reversible manner, either on exposure to lowered pH (below 4.0) or on receptor binding. This high affinity for iron is linked to many of its biological functions including antimicrobial effects. Various laboratory studies have reported that the*

*structural integrity of LF is critical for its antimicrobial effects against bacteria, fungi, protozoa, and viruses. However, the activity of LF, like the activity of most proteins, is highly dependent on the three-dimensional or tertiary structure of the protein. If the protein does not have the proper conformation its activity is diminished or lost. LF's instability limits its usefulness. Milieu conditions such as metals (iron in particular), carbonic ions, salts, pH and conductivity affect the antimicrobial properties of LF."*

As such, Applicants respectfully submit that Naidu teaches away from employing low pH values, such as pH's below 3, since the use of such low pH values induces iron release from the lactoferrin, which adversely affects LF's antimicrobial properties. Accordingly, Naidu teaches the preferred use of a specific acid:base:salt buffer for coordinated metal binding properties. See, for example, page 14, lines 18-19 of Naidu. In light of such teachings of Naidu, a skilled artisan would be motivated to employ citric acid in combination with about a ten-fold excess of base, so as to keep the pH at elevated levels, such as preferably between 5.5-7.5. See, for example, page 14, lines 18-29, and claim 17 of Naidu.

In light of the preceding remarks, Applicants' claims are believed to be unobvious and patentable over Naidu. Reconsideration and withdrawal of the present rejection are respectfully requested.

**New Claims:**

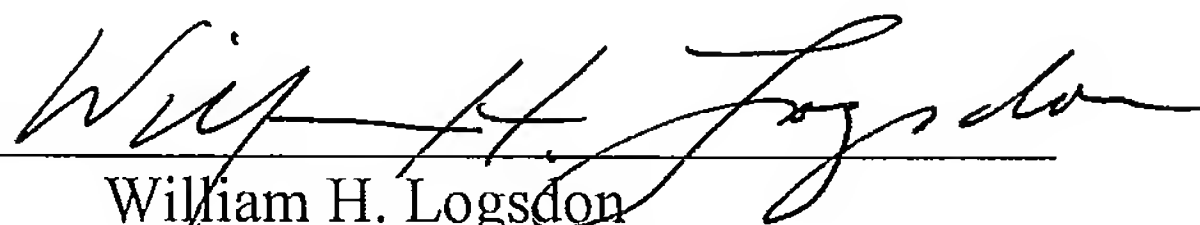
Added claims 68-71 are believed to be patentable at least for the same reasons discussed previously herein.

**CONCLUSION**

In light of the preceding remarks, Applicants' presently pending claims are deemed to define an invention that is unanticipated, unobvious, and, hence, patentable. Reconsideration of the rejections and allowance of all of the presently pending claims are respectfully requested.

Respectfully submitted,

THE WEBB LAW FIRM

By 

William H. Logsdon

Registration No. 22,132

Attorney for Applicants

436 Seventh Avenue

700 Koppers Building

Pittsburgh, PA 15219

Telephone: (412) 471-8815

Facsimile: (412) 471-4094

E-mail: [webblaw@webblaw.com](mailto:webblaw@webblaw.com)